

Versatility of Submental Intubation in Midfacial Fractures: Case Report.

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ABSTRACT

Airway management for those patients who suffered from midfacial fractures is complicated as tracheostomy and nasotracheal intubation may lead to other complications. Nasal intubation can interfere with centralization and stabilization of nasal fractures. To preserve from this complication, submental intubation is the alternative procedure especially where short-term postoperative control of airway is desirable with the presence of undisturbed access to oral as well as nasal airways and a good dental occlusion can be achieved during the surgical procedure. We present a case of panfacial fracture which was managed successfully with submental intubation.

Keywords: Midfacial fractures, Submental intubation, Maxillofacial trauma, Airway management, Naso-tracheal intubation, Oro-tracheal intubation

INTRODUCTION

Management of airway is the significant issues in the midfacial fractures and associated nasoethmoidal injuries; as the airway can be managed by the nasal intubation or by endotracheal intubation but this intubation can cause complications like injury to cranial base and orotracheal intubation will interfere in the maxillomandibular fixation so, Tracheostomy will be the next option for airway management which is the best procedure for the airway management but some reviews shows that tracheostomy has a iatrogenic complications such as scarring and fistula to the tracheoesophageal route, laryngeal nerve damage, stenosis of trachea.

To prevent this complication through this procedure an alternative method is used ie submental intubation and it has minimal complications. Submental intubation allows for the avoidance of tracheal dissection and eliminates the risk of nasotracheal intubation in the management of midfacial fractures. As this technique continue the passing of endotracheal tube through the anterior floor of the mouth to allow free intraoperative access to the dental occlusion and to

the nasal pyramid without endangering patients with midface fractures. The purpose of this study to describe the outcome of series of patients who had undergone this submental intubation for the surgical correction of midfacial fractures.

MATERIAL AND METHODS

A 24 years patient reported to oral and maxillofacial surgery department with complaining of pain, swelling and difficulty in mouth opening since 3 days. On taking proper history patient gave history of Road traffic accident 3 days back and emergency treatment was given by nearby hospital. When he reported to Dept of OMFS, patient was conscious with the glass coma score of 15 (E4V5M6) and there was no history of bleeding from the nose and ear. On extraoral examination there was a bilateral diffuse cheek swelling with periorbital swelling and also there was a bilateral subconjunctival haemorrhage with posterior limit, tenderness and step defect on the nasal bone. Patient had parasthesia on the right side of the face.



Patient Profile & Pre operative occlusion

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On intraoral examination there was a dearranged occlusion bilaterally and presence of anterior open bite. Radiological examination confirms that the Le-fort 1 with Le-fort 2 fracture with nasal bone fracture.

After clinical and radiological examination the patient was scheduled for the correction of multiple facial fracture. As the patient have the nasal fracture so nasal intubation is contraindicated. Oral intubation was not possible because during surgical correction of fracture it was interfere with the occlusion and intermaxillary fixation.

To avoid the complication from tracheostomy as we discussed earlier submental endotracheal intubation was planned for it.

Operative Procedure

After neurological consultation and pre-anaesthetic clearance the patient was planned for the surgical correction of the multiple facial fractures. Patient was kept fasting for 8 hrs preoperatively. After sterile panting and draping was done of chin and mouth. Orointubation was done first which convert into the submental intubation. Lignocaine 2% was administered at the site of incision. After administration of local anesthesia, incision of 1cm in length was given at the anterior to inferior border of mandible and a curved haemostat was inserted by the submental incision which was extended into the oral cavity by doing blunt dissection and haemostat is opened to create a soft tissue for the endotracheal tube. With that haemostat pilot tube cuff was passed out extraorally the tube connector was reattached and the endotracheal tube and reconnected to the anesthesia breathing circuit. After confirmation of its adrequate position the tube was reconnected and secured to the skin of the submental area with 3-0 silk sutures, Intraorally the tube was positioned between the tongue and the mandible just above the mucosa of the floor of the mouth. After doing submental endotracheal intubation preocclusion was achieved by maxillomandibular fixation after that anatomic reduction and fixation of the fractures was achieved by miniplate osteosynthesis.

As there was no nasal intubation so reduction of nasal bone was done easily. Temporary mmf was released and entotracheal tube is pulled out in reverse order after removal of endotracheal tube submental incision was closed with 3-0 interrupted silk suture.



Prepare the patient & Incision given and create Submental Tunnel



Submental Intubation

RESULTS

We performed submental intubation in 8 patients with maxillofacial trauma. The patients ranged in age from 18–50 years, and all cases had a nasal bone fracture. Fifty percent of patients also presented with mandibular fracture.

There were no complications due to submental intubation, such as infection, hypertrophic scarring, lingual nerve injury, hematoma, bleeding, ranula formation, or orocutaneous fistula. All patients were extubated in the operative room after fracture treatment.

Table: Age distribution and type of facial fractures in patients with submental intubation

Case	Gender	Age	Type of fracture
A	M	36	Lefort I with nasoethmoid fracture
B	M	28	Lefort I with nasal and right frontozygomatic fracture
C	M	38	Lefort III Lefort I mandibular symphysis and bilateral condylar fracture
D	F	41	Symphysis; bilateral condyle; Lefort I; Left ZMC
E	M	23	Lefort III with mandibular left angle fracture
F	M	34	NOE; Lefort I
G	M	43	Lefort III; Lefort I; mandibular symphysis
H	M	27	Nasal bone with right ZMC and Lefort I

DISCUSSION

Maxillofacial trauma requires special attention as it involves both vital and non-vital organs and a skilful team approach of medical professionals can save the life of the patient from these life threatening injuries.

Management of airway is a major concern in patients with maxillofacial trauma because a compromised airway can lead to death. Airway management for patients who suffer panfacial fractures is complicated. Facial bones, i.e. maxilla and mandible are unique because they have teeth embedded in them. Thus treatment of fractures of

such bones presents a certain difficulty as in not only do the fracture fragments have to be aligned but the teeth have to be kept in proper occlusion as well. To achieve a proper pre-traumatic occlusion, the occlusion has to be maintained and checked at all times during the surgery. When only the mandible or maxilla is fractured, a nasal intubation suffices to achieve the goal. However, a panfacial fracture can present its problems with regards to occlusion. Tracheostomy and nasotracheal intubation may lead to other complications. Nasal intubation can interfere with centralization and stabilization of nasal fractures. An orotracheal tube may compromise the reduction and maintenance of panfacial fractures.. There are various methods available for airway management in patients with maxillofacial trauma, but choice of a particular technique depends upon many factors like extent of facial injury, the composition and the anatomy of the injury, depends upon whether patient is being intubated in emergency room or in the operation theatre for surgery when the patient is in relatively controlled conditions.

In maxillofacial trauma anaesthesiologist has to share the upper airway field with the surgeon. In these injuries, apart from anaesthetic consideration, surgeon's requirement is major factor in deciding the technique of intubation. The changing trends of surgery for maxillofacial trauma has also affected the choice of technique of intubation. With the available new techniques and technology almost all the facial fractures are treated with open reduction and internal fixation using microplating. So intraoperative dental occlusion by intermaxillary fixation is required for the proper alignment of the fracture fragments and their rigid fixation. When neither nasotracheal nor orotracheal intubation is suitable, temporary tracheostomy is frequently the option of choice. This technique, however, is associated with significant morbidity. Complications include haemorrhage, recurrent laryngeal nerve damage, subcutaneous emphysema, tracheal stenosis, and a cosmetically undesirable scar.

Although most of the anaesthesia text books include basilar fractures and nasoethmoidal fractures in the list of contraindications of nasotracheal intubation. But there is now enough data to suggest that nasotracheal intubation is not an absolute contraindication in the presence of nasal bone fractures, base of skull fractures and CSF leak. To avoid this complication submental intubation was planned for this study.

This submental intubation was introduced by Altemir in 1986 .The first description of this technique included a midline submental skin incision and subperiosteal dissection in the mandibular bone to introduce an anesthesia tube inside the dental arch. Two modifications of this technique are used more frequently today;

supraperiosteal dissection and submandibular intubation Submental intubation is very useful in particular situations, especially in panfacial maxillofacial trauma patients where it may be used instead of short-term tracheotomy unless it is necessary to support the airway for prolonged periods.

A one cm incision was placed on that part of the tube which encloses the connector. The connector was easily prised off the tube. The connector was then kept back in its original place and fastened with elastoplast. We started with a regular intravenous anaesthetic induction. The prepared 8.5 mm flexometallic endotracheal tube was placed orally. The surgeon made a 1-cm incision posterior to the symphysis menti in the midline [Figure 1]. A Kelly forceps was introduced through the skin incision and into the floor of the mouth by blunt dissection The forceps was kept close to the inner side of the mandible. After establishment of the submental tract, the elastoplast over the connector was removed and the connector was detached from the endotracheal tube. The pilot balloon and then the free end of the endotracheal tube were pulled out through the submental incision with the forceps. The connector was attached to the free end of the endotracheal tube and refastened with elastoplast and reconnected to the anaesthetic circuit The tracheal tube was anchored in place using stay sutures. Careful attention was paid to capnography to ensure the tube has not been pulled out of the trachea. The submental intubation procedure took 5 minutes to perform. The exercise was repeated at the end of the surgery to return the endotracheal tube to the oral position. We opted for a propofol based total intravenous anaesthesia as the nitrous oxide is contraindicated in pneumocephalus. Submental intubation was done in 8 patients where nasal intubation was not possible due to severe soft tissue trauma of nose or cases in which pre-existing nasal pack could not be removed as these cases were taken for surgery immediately after emergency nasal packing. No significant complication was seen in our patients, except for lingual haematoma over anterior floor of mouth in the first case. The patient was kept on oral antibiotics postoperatively. The haematoma was transient and resolved spontaneously in a week. The anterior sublingual haematoma was possibly due to midline dissection through the genial muscles. We modified our subsequent cases with a paramedian incision placed in submental-submandibular region about 2 cm lateral to the midline. This avoided both the genial muscles & opening of submandibular duct in the midline and submandibular gland and lingual nerve posteriorly. The postoperative healing in all our cases was uneventful. The extraoral scar healed with acceptable aesthetic result. Unlike tracheostomy which often leads to significant scarring, the

incision mark of submental intubation was small and hidden well in the skin crease. However submental intubation should be used with caution in patient with history of hypertrophic scarring and keloid tendency.

CONCLUSION

Decision of airway management in maxillofacial trauma has to be taken after mutual discussion of the surgeon and anaesthesiologist keeping in view the patient's condition and demands of surgery.. Technique of intraoperatively changing the nasotracheal tube to orotracheal tube in cases of panfacial fractures is a simple and logical method without any complication. In the era of rigid fixation of fractures and the possibility of leaving the patient with an open mouth, an alternative technique of airway management, i.e, nasotracheal to orotracheal intubation may replace the need for tracheostomy or submental intubation, thus avoiding their associated complications. As the study shows the submental intubation is extremely useful technique with very low rate of complication. It offers faster, safer and economical alternative to tracheostomy for airway management in patients with maxillofacial injury where both oral and nasal intubations are contraindicated, and long term ventilation support is not required.

REFERENCES

1. Taher AA. Nasotracheal intubation in patients with facial fractures. *Plast Reconstr Surg.* 1992; 90(6): 1119–20.
2. Sharma RK, Tuli P, Cyriac C, Parashar A, Makkar S. Submental tracheal intubation in oromaxillofacial surgery. *Indian J Plast Surg.* 2008; 41(1): 15–9.
3. Uma G, Viswanathan PN, Nagaraja PS. Submandibular approach for tracheal intubation – a case report. *Indian J Anaesth.* 2009; 53(1): 84–7.
4. Gibbons AJ, Hope DA, Silvester KC. Oral endotracheal intubation in the management of midfacial fractures. *Br J Oral Maxillofac Surg.* 2003; 41(4): 259–60. No abstract available.
5. Schütz P, Hamed HH. Submental intubation versus tracheostomy in maxillofacial trauma patients. *J Oral Maxillofac Surg.* 2008; 66(7): 1404–9.
6. Martinez-Lage JL, Eslava JM, Cebrecos AI, Marcos O. Retromolar intubation. *J Oral Maxillofac Surg.* 1998; 56(3): 302–5; discussion 305–6.
7. Lima SM Jr, Asprino L, Moreira RW, de Moraes M. A retrospective analysis of submental intubation in maxillofacial trauma patients. *J Oral Maxillofac Surg.* 2011; 69(7): 2001–5.
8. Lewis RJ. Tracheostomies. Indications, timing, and complications. *Clin Chest Med.* 1992; 13(1): 137–49.
9. Chandu A, Smith AC, Gebert R. Submental intubation: an alternative to short-term tracheostomy. *Anaesth Intensive Care.* 2000; 28: 193–5.
10. MacInnis E, Baig M. A modified submental approach for oral endotracheal intubation. *Int J Oral Maxillofac Surg.* 1999; 28(5): 344–6.
11. Green JD, Moore UJ. A modification of sub-mental intubation. *Br J Anaesth.* 1996; 77: 789–91.
12. MacInnis E, Baig M. A modified submental approach for oral endotracheal intubation. *Int J Oral Maxillofac Surg.* 1999; 28: 344–6. Rahpeyma A, et al 22, *Iranian Journal of*

- Otorhinolaryngology No.1, Vol.25, Serial No.70, Winter 2013
13. Altemir FH. The submental route for endotracheal intubation. *J Maxillofac Surg.* 1986; 14: 64–5.
14. Tagliatalata Scafati C, Maio G, Aliberti F, Tagliatalata Scafati S, Grimaldi PL. Submento-submandibular intubation: is the subperiosteal passage essential? Experience in 107 consecutive cases. *Br J Oral Maxillofac Surg.* 2006; 44(1): 12–4.
15. Stoll P, Galli C, Wächter R, Bähr W. Submandibular endotracheal intubation in panfacial fractures. *J Clin Anesth.* 1994; 6(1): 83–6.
16. Altemir FH, Montero SH. The submental route revisited using the laryngeal mask airway: a technical note. *J Craniomaxillofac Surg.* 2000; 28(6): 343–4.
17. Caron G, Paquin R, Lessard MR, Trépanier CA, Landry PE. Submental endotracheal intubation: an alternative to tracheotomy in patients with midfacial and panfacial fractures. *J Trauma.* 2000; 48(2): 235–40.
18. Altemir FH, Montero SH, Peña M. Combitube SA through submental route. A technical innovation. *J Craniomaxillofac Surg.* 2003; 31(4): 257–9.
19. Altemir FH, Montero SH. The submental route revisited using the laryngeal mask airway: a technical note. *J Craniomaxillofac Surg.* 2000; 28(6): 343–4.
20. Hejiang Z, Yunling W, Tiande Y. Submental tracheal intubation for resection of recurrent giant pituitary tumor: a case report. *Journal of Medical Colleges of PLA* 2011; 26: 40–44.
21. Nyárády Z, Sári F, Olasz L, Nyárády J. Submental endotracheal intubation in concurrent orthognathic surgery: a technical note. *J Craniomaxillofac Surg.* 2006; 34(6): 362–5.
22. Chandu A, Witherow H, Stewart A. Submental intubation in orthognathic surgery: initial experience. *Br J Oral Maxillofac Surg.* 2008; 46(7): 561–3.
23. Kar C, Mukherjee S. Submental intubation: an alternative and cost-effective technique for complex maxillofacial surgeries. *J Maxillofac Oral Surg.* 2010; 9(3): 266–9.
24. Stranc MF, Skoracki R. A complication of submandibular intubation in a panfacial fracture patient. *J Craniomaxillofac Surg.* 2001; 29(3): 174–6.
25. Gordon NC, Tolstunov L. Submental approach to oroendotracheal intubation in patients with midfacial fractures. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1995; 79(3): 269–72.
26. Meyer C, Valfrey J, Kjartansdottir T, Wilk A, Barrière P. Indication for and technical refinements of submental intubation in oral and maxillofacial surgery. *J Craniomaxillofac Surg.* 2003; 31(6): 383–8.
27. Stranc MF, Skoracki R. A complication of submandibular intubation in a panfacial fracture patient. *J Craniomaxillofac Surg.* 2001; 29(3): 174–6.
28. Gordon NC, Tolstunov L. Submental approach to oroendotracheal intubation in patients with midfacial fractures. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1995; 79(3): 269–72.
29. Jundt JS, Cattano D, Hagberg CA, Wilson JW. Submental intubation: a literature review. *Int J Oral Maxillofac Surg.* 2012; 41(1): 46–54.
30. Garg M, Rastogi B, Jain M, Chauhan H, Bansal V. Submental intubation in panfacial injuries: our experience. *Dent Traumatol.* 2010.

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